AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for transforming a general on-line analytical processing dimension into an at least partly aggregation normalised dimension, ~~i.e. a dimension with improved summarisability,~~ by means of a computer, the dimension having dimension values organised into categories of dimension values based on a partial ordering, the dimension comprising mappings of links between dimension values, the method comprising the steps of

retrieve the mapping from data storage means associated with the computer,

analysing the mapping to determine irregularities of the dimension , ~~i.e. features rendering the dimension non-summerisable,~~ by means of analysing means executed by the computer,

creating new dimension values of the dimension and modifying the mapping between dimensional values of the dimension according to the analysis, whereby the dimension is at least partly aggregation normalised, and

saving the new dimension values and the modified mappings in data storage means of the computer.

2. (Currently Amended) A method according to claim 1, wherein the step of creating new dimensional values and modifying the mapping comprises the steps of

examine whether the dimension is covering, ~~i.e. that only immediate parent and child values can be related,~~ as well as onto, ~~i.e. that all paths in the hierarchy have equal lengths,~~ and in case it is,

executing a make-strict procedure for making the dimension aggregation strict, ~~i.e. that each child in a hierarchy has only one parent,~~ thereby making the ~~non-strict~~ dimension aggregation normalised~~, i.e. summarisable~~.

3. (Previously Presented) A method according to claim 1, wherein the step of creating new dimensional values and modifying the mapping comprises the steps of

examine whether the dimension is covering, and in case it is,

executing a make-onto procedure for making the dimension onto, thereby at least partly making an non-onto dimension aggregation normalised.

4. (Previously Presented) A method according to claim 1, wherein the step of creating new dimensional values and modifying the mapping comprises the step of

executing a make-covering procedure for making the dimension covering, thereby at least partly making a non-covering dimension aggregation normalised.

5. (Currently Amended) A method according to claim ~~1~~2, wherein the make-strict procedure comprises the steps of, starting from the bottom category and successively proceeding towards the top category,

identifying combinations of dimensional values of the same category for each of which combination at least one dimension value of a category below said category is linked to each of the dimension values of the combination,

creating one or more new dimensional values each representing one of the identified combinations of dimensional values and creating links from the new dimensional values to dimensional values of above categories in accordance with existing links from each of the dimensional values represented by the new dimensional value, and

identifying dimension values being linked to identified combinations of dimensional values of the same category and replacing the links with links to new dimensional values representing said combinations of dimensional values.

6. (Previously Presented) A method according to claim 2, wherein the make-strict procedure comprises the successive steps of

(i) setting the bottom category of the dimension as the child category,

(ii) for each category being a direct predecessor of the child category of which category at least one dimension value of the child category is linked to a dimension value of, setting said category as the parent category and performing the steps of:

(iia) ending the make-strict procedure for the parent category in case the parent category is the top category of the dimension,

(iib) ending the make-strict procedure for the parent category in case no dimension value of the parent category is linked to a dimension value of a higher category,

(iic) creating a new fused category in the dimension immediately below the parent category in case at least one of the dimension values of the child category is linked to more than one dimension value of the parent category,

(iid) for each dimensional value of the child category, performing the steps of: creating a new dimension value of the new fused category representing the one or more values of the parent category to which the dimensional value of the child category is linked and creating links from said new dimension value to said values in the parent category, the creation of the new dimension value being conditioned that no dimension value of the new fused category already exists having exactly such link(s), and

for each category being a direct predecessor of the parent category of which category at least one dimension value of the parent category is linked to a dimension value of, setting said category as a grandparent category and creating links from the new dimension value to the one or more dimension values of the grandparent category to which said one or more dimensional values of the parent category are linked,

(iie) removing the links from the parent category to the one or more grandparent categories, whereby the grandparent categories no longer are direct predecessors of the parent category,

(iif) creating links from each dimensional value of the child category to the dimension value of the new fused category having the same links to the dimension values of the parent category whereby the new fused category becomes a direct predecessor of the child category, and removing the links from the dimension values of the child category to the parent category, whereby the parent category no longer is a direct predecessor of the child category, and

(iig) setting the new fused category as the child category and returning to step (ii).

7. (Previously Presented) A method according to claim 3, wherein the make-onto procedure comprises the steps of, starting from the top category and successively proceeding towards the bottom category,

creating, for each dimension value of each category above the bottom category not being linked to any dimensional value of the category immediately below, a new dimension value in the category immediately below and creating a link between said new dimension value and said dimension value of the category in question.

8. (Previously Presented) A method according to claim 3, wherein the make-onto procedure comprises the successive steps of

(i) setting the top category of the dimension as the parent category,

(ii) for each category immediately below the parent category and having dimension values being linked to dimension values of the parent category, setting said category as the child category and perform the steps of

(iia) creating, for each dimension value of the parent category not being linked to any dimensional value of the child category, a new dimension value in the child category and creating a link between said new dimension value and said dimension value of the parent category,

(iib) setting the child category as parent category,

(iic) ending the make-onto procedure in case the parent category is the bottom category of the dimension, else returning to step (ii) of the make-onto procedure.

9. (Previously Presented) A method according to claim 4, wherein the make-covering procedure comprises the successive steps of

identifying links between dimension values of two categories having at least one intermediate category there between,

creating a new dimension value in each of said intermediate categories for each of those links for which no paths of links exists going only through immediate child-parent links from lower to higher categories and including a link to a dimension value of the intermediate category, and

replacing those links with links between the dimension values of those links and the new dimension values.

10. (Currently Amended) A method according to claim 4, wherein the make-covering procedure comprises the successive steps of

(i) setting the bottom category of the dimension as the child category,

(ii) for each category immediately above the child category for which at least one link between a dimension value of said category and a dimension value of the child category exists, setting the category as the parent category and perform the steps of:

(iia) ending the make-covering procedure for the parent category in case the parent category is the top category of the dimension~~:~~,

(iib) for each higher category being a direct predecessor category of the child category and being higher in the hierarchy than the parent category, performing the steps of

(iiba) identifying sets of dimension values of the higher category and dimension values of the child category for which sets

a link exists, and

no paths of links going only from lower to higher categories and including a link to a dimension value of the parent category exists, and

(iibb) creating for each identified set of dimension values a new dimension value in the parent category, creating links between each of the dimension values of the set and the new dimension value, and removing the link between the two dimension values of the identified set, whereby the higher category no longer is a predecessor of the child category,

(iic) setting the parent category as the child category and returning to step (ii).

11. (Previously Presented) A method for by means of a computer to at least partly aggregation normalise a multidimensional object including a set of facts comprising a plurality of facts mapped on a plurality of dimensions having dimension values organised into categories of dimension values based on a partial ordering, the multidimensional object comprising mappings of links between dimension values within each dimension, by means of applying the method of claim 1 to at least one of the dimensions of the multidimensional object.

12. (Original) A method according to claim 11, wherein the multidimensional object comprises a plurality of facts and the mapping comprises links from each of the facts to at least one dimension value in each of the plurality of dimensions, the facts constituting the bottom layer of each of the dimensions of the multidimensional object.

13. (Previously Presented) A method according to claim 11, comprising the steps of

selecting a subset of categories of the one or more dimension to be aggregation normalised, and

performing an aggregation normalisation of the selected subset,

whereby one or more of the dimensions of the multidimensional object is/are only partly aggregation normalised.

14. (Currently Amended) A method according to claim 11, comprising the steps of

selecting specific aggregation functions to be performed on the multidimensional object, and

selecting by means of the computer normalisation steps to be performed based on the selection of specific aggregation functions to be performed,

whereby one or more of the dimensions of the multidimensional object is/are only partly aggregation normalised. -

15. (Currently Amended) A method for by means of a computer to at least partly aggregation normalise a general on-line analytical processing multidimensional object including a set of facts comprising a plurality of facts mapped on an aggregation normalised plurality of dimensions having dimension values being organised into categories of dimension values

based on a partial ordering, the multidimensional object comprising mappings of links between dimension values within each dimension,

the method comprising the steps of

retrieve the mapping from data storage means associated with the computer,

including the mapping of the plurality of facts on the multidimensional object into the mapping of the multidimensional object so that the mapping comprises links from each of the facts to at least one dimension value in each of the plurality of dimensions, and the facts constitute ~~constitutes~~ the bottom layer of each of the dimensions of the multidimensional object,

analysing the mapping of the multidimensional object to determine irregularities of the dimensions by means of analysing means executed by the computer,

creating new dimension values of the multidimensional object and modifying the mapping between dimensional values of the multidimensional object according to the analysis, whereby the multidimensional object is at least partly aggregation normalised, and

saving the new dimensions and the modified mapping in data storage means of the computer.

16. (Currently Amended) A method according to claim 15, wherein the step of creating new dimensional values and modifying the mapping comprises the step of

executing a make-strict procedure for making the multidimensional object aggregation strict, thereby making the ~~non-strict~~ multidimensional object aggregation normalised, the make-strict procedure being executed on the condition that the multidimensional object is covering prior to the execution.

17. (Previously Presented) A method according to claim 15 , wherein the step of creating new dimensional values and modifying the mapping comprises the step of

executing a make-covering procedure for making the multidimensional object covering, thereby at least partly making the non-covering multidimensional object aggregation normalised.

18. (Previously Presented) A method according to claim 15, wherein the method comprises the initial step of making each of the plurality of dimensions aggregation normalised.

19. (Previously Presented) A method according to claim 11, wherein the created new dimensional values are marked as such, a pre-aggregation is performed on a multidimensional object being normalised by means of the computer and the method further comprises the step of

producing a reply to a query made to the system and concerning the multidimensional object, aggregate queries, exploring the dimension hierarchies, as well as navigation queries, that summarise the data at various levels of detail, in which reply the existence of the created new dimensional values is transparent.

20. (Previously Presented) A method according to claims 11, further comprising the steps of

implementing, into the aggregation normalised multidimensional object, of new facts including mapping of the facts onto the dimension, of new dimension values of the dimensions, or of new mapping between some of the dimension values, by which implementation irregularities of the multidimensional object is introduced,

analysing the introduced irregularities of the dimensions of the multidimensional object,

creating new dimensional values of the multidimensional object and modifying the mapping between dimensional values of the multidimensional object according to the analysis, whereby the multidimensional object is aggregation normalised, and

saving the new dimensions and the modified mapping in data storage means of the computer.

21. (Previously Presented) A computer system comprising at least one general purpose computer having data storage means associated therewith on which data storage means is stored a computer programme product suitable for adapting the computer to perform an at least partly aggregation normalisation of a multidimensional object according to the method of claim 11, the computer system comprising means for retrieving the computer programme product and perform accordingly.

22. (Previously Presented) A computer programme product suitable for adapting a general purpose computer to perform an at least partly aggregation normalisation of a multidimensional object according to the method of claim 11.

23. (Original) A computer system for on-line analytical processing having data storage means associated therewith on which a multidimensional object is stored, the multidimensional object including

a set of facts comprising a plurality of facts,

a first plurality of dimensions having dimension values being organised into categories of dimension values based on a partial ordering and comprising a first mapping of links between dimension values within each dimension of the first plurality of dimensions as

well as links between the facts and the dimensions of the first plurality of dimensions, at least one of the dimensions of the first plurality of dimensions being irregular, and

a second plurality of dimensions having dimension values being organised into categories of dimension values based on a partial ordering and comprising a second mapping of links between dimension values within each dimension of the second plurality of dimensions as well as links between the facts and the dimensions of the second plurality of dimensions, each of the second plurality of dimensions being aggregation normalised,

the computer system comprising a query handler component being adapted for producing replies to queries made to the computer system and concerning the multidimensional object, the replies to navigation queries being based on the first set of dimensions and the replies to aggregate queries being based on the second set of dimensions.

24. (Original) A computer system according to claim 23, wherein a set of pre-aggregation data relating to the second plurality of dimensions is further stored within the data storage means and the replies to aggregate queries furthermore are based on the set of pre-aggregation data.

25. (Previously Presented) A computer system according to claim 23 , wherein the query handler component is adapted for producing replies to aggregate queries in which replies the existence of the second plurality of dimensions is transparent.

26. (Previously Presented) A computer system according to claim 25, wherein the query handler component is adapted for transforming aggregate queries made to the first plurality of dimensions into queries for the second set of dimensions and transforming replies based on

the second set of dimensions into replies as based on the first set of dimensions, thus making the existence of the second plurality of dimensions transparent in the produced reply.

27. (Currently Amended) A computer system according to claim 26, wherein the multidimensional object is stored within the data storage means of the computer system in tables organised as a combination of star schemes for the part of the multidimensional object containing only strict mappings, and additional tables containing the ~~non-strict~~ part of the mappings, the query handler component makes use of said tables in transforming queries and replies.

28. (Previously Presented) A computer system according to claim 23 further comprising means adapted for performing an at least partly aggregation normalisation of a multidimensional object.